

# Claims

[c1] What is claimed is:

1.A method for forming a non-rubbing alignment layer, comprising:

providing a vacuum chamber disposed therein with an evaporation source, a substrate, and an ion source, wherein said substrate has a flat main surface facing said evaporation source, and said ion source generates an ion beam that bombards said flat main surface with an oblique incident angle  $\alpha$  with respect to a line normal to said flat main surface;

rotating said substrate at a constant rotation speed; and heating said evaporation source to vaporize inorganic substances of said evaporation source to diffuse and deposit onto said flat main surface substantially along said line normal to said flat main surface, thereby forming said non-rubbing alignment layer, wherein during deposition of said non-rubbing alignment layer, said ion beam emanated from said ion source continues to bombard said flat main surface.

[c2] 2.The method according to claim 1 wherein said non-rubbing alignment layer is tilted homeotropic alignment

layer for liquid crystal molecules.

- [c3] 3.The method according to claim 1 wherein by altering ion energy of said ion beam, alignment force of said non-rubbing alignment layer is optimized.
- [c4] 4.The method according to claim 3 wherein said ion energy of said ion beam is adjusted by changing ion current and /or ion voltage thereof.
- [c5] 5.The method according to claim 4 wherein said ion current is between 0.1 Amp and 4.5 Amp.
- [c6] 6.The method according to claim 4 wherein said ion voltage is between 10 V and 145 V.
- [c7] 7.The method according to claim 1 wherein by altering said oblique incident angle  $\alpha$  of said ion beam, pre-tilt of said alignment layer is changed.
- [c8] 8.The method according to claim 7 wherein said oblique incident angle  $\alpha$  is between 40° and 45°.
- [c9] 9.The method according to claim 1 wherein said alignment layer is made of  $\text{SiO}_x$ .
- [c10] 10.The method according to claim 1 wherein said rotation speed does not exceed 12 rpm.
- [c11] 11.A non-rubbing alignment layer for liquid crystal

molecules fabricated according to the method as set forth in claim 1.